APPENDIX 4

MAJOR EQUIPMENT LIST

The Equipment List on the following pages lists the major equipment associated with the Repowering Project and is listed by the JEA GEMS (or System) Code. Since the P&ID's are defined and numbered by their associated GEMS code, the equipment is also listed by P&ID. The quantity, percent capacity, and redundancy is indicated for each item of equipment. This information is indicated for Unit 2, Common, and Unit 1 equipment, since some items of equipment serve as an installed back-up for both units.

A copy of the JEA GEMS Code Definitions is attached for reference.

JEA Large-Scale CFB Demonstration Project
Major Equipment List

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
AB	INSTRUMENT AIR DRYERS		3		Nominal 50% Capacity Each	Serve Units 1, 2, and 3
AC	AIR COMPRESSORS		6		Nominal 25% Capacity Each	Provide Service and Instrument Air for Units 1, 2, and 3
BB	STEAM GENERATOR	1		1		
BB	STEAM DRUM	1		1		
BC	SECONDARY AIR TUBULAR AIR HEATER	1		1		
BC	PRIMARY AIR TUBULAR AIR HEATER	1		1		
BF	ELBOW DUCT BURNERS	3		3		For Start-up Only
BI	SOOTBLOWER PRIMARY SUPERHEATER	8		8		
BI	SOOTBLOWER FINAL REHEATER	6		6		
BI	SOOTBLOWER REHEATER	6		6		
BI	SOOTBLOWER ECONOMIZER	16		16		
BK	BOILER BLOWDOWN DRUM	1		1		
BN	PRIMARY AIR FAN	2		2	50% Capacity Each	
BN	SECONDARY AIR FAN	2		2	50% Capacity Each	

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
BN	PRIMARY AIR BOOSTER BLOWER	3		3		For Duct Burners - Start-up Only
BN	PRIMARY AIR FAN LUBE OIL SKID	2		2		One per Fan
BO	INDUCED DRAFT FAN	2		2	50% Capacity Each	
BO	ID FAN INLET ISOLATION DAMPER	2		2		One per Fan
BO	ID FAN OUTLET ISOLATION DAMPER	2		2		One per Fan
BO	CONCRETE CHIMNEY		1			With Separate Flue for Each Unit
EF	MCC/LOAD CENTER/SWITCHGEAR	1 LOT	1 LOT	1 LOT		Essentially all MCC's, Load Centers, and Switchgear were replaced for Unit 2, Common, and Unit 1 Equipment
FG	FUEL UNLOADING DOCK		1			
FH	COINTINUOUS SHIP UNLOADER		1			
FH	COKE/COAL BELT CONVEYORS TO DOMES		7			Single String of Conveyors to Storage Domes
FH	COKE/COAL STORAGE DOMES		2		85,000 Tons per Dome	
FH	RADIAL STACKER RECLAIMER		2		100% Capacity Each	One per Dome - Serve Units 1 and 2
FH	SILO FILL COKE/COAL CONVEYORS		8		100% Capacity Each	Two Full Capacity Strings of Conveyors - Serve Units 1 and 2
FH	COKE/COAL CRUSHER		2		100% Capacity Each	Serve Units 1 and 2
FH	COKE/COALTRAVELING TRIPPER		2		100% Capacity Each	Serve Units 1 and 2
FN	BOILER COAL/COKE SILO	5		5		

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
FN	COKE/COAL DRAG CONVEYOR	2		2		For Rear Wall Feed
FN	COKE/COAL GRAVAMETRIC FEEDER	8		8		
GA	GENERATOR	1		1		
GC	MAIN SEAL OIL PUMP	1		1		
GC	EMERGENCY SEAL OIL PUMP	1		1		
GC	SEAL OIL VACUUM PUMP	1		1		
GC	SEAL OIL TANK	1		1		
GI	STATOR COOLING WATER PUMP	2		2	100% Capacity Each	
GI	DEIONIZER	1		1		
GI	STATOR COOLING WATER STORAGE TANK	1		1		
GI	STATOR COOLING WATER COOLERS	2		2	100% Capacity Each	
HB	NASH VACUUM PUMP	1	1	1	100% Capacity Each	
HD	BITTER WATER PUMP	1		1		
HD	BOILER FILL PUMP	1				Serves Units 1, 2, and 3
HF	CONDENSATE BOOSTER PUMP	2		2	100% Capacity Each	With Variable Speed Fluid Drives
HF	BED ASH COOLING WATER PUMP	2		2	100% Capacity Each	
HF	DEAERATOR (FWH 3) STORAGE TANK	1		1		

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
HF	DEAERATOR (FWH 3) HEATER SECTION	1		1		
HF	FEED WATER HEATER NO. 4	1		1		
HF	FEED WATER HEATER NO. 5	1		1		
HF	FEED WATER HEATER NO. 6	1		1		
HK	HEATER DRAIN PUMP	2		2	100% Capacity Each	
HK	FEED WATER HEATER NO. 6 HOTWELL	1		1		
HP	SULFURIC ACID MIXING SKID	1				
HP	CAUSTIC MIXING SKID	1				
HP	POLISHER RECYCLE PUMP	1		1		
HP	POLISHER SLUICE PUMP			1		
HP	POLISHER REGENERATION WATER PUMP	1				
HP	CAUSTIC RECYCLE PUMP	1				
HP	CONDENSATE POLISHER VESSEL	3		3	50% Capacity Each	
HP	CONDENSATE POLISHER SEPARATION AND ANION REGENERATION VESSEL	1		1		
HP	CONDENSATE POLISHER CATION REGENERATION VESSEL	1		1		
HP	CONDENSATE POLISHER MIX AND HOLD VESSEL	1		1		

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
HP	CONDENSATE POLISHER HOT WATER TANK	1		1		
HP	WASTE INSPECTION TANK	1				
HP	POLISHER RESIN TRAP	3		3		One per Polisher Vessel
IB	TRAVELING WATER SCREENS	2		2	50% Capacity Each	
IB	SCREEN WASH PUMPS		2			Serve Units 1, 2, and 3
MA	BOILER FREIGHT ELEVATOR	1		1		
MJ	BOILER SAMPLE PANEL CHILLER	1		1		
MJ	BOILER SAMPLE PANEL	1		1		
MJ	SAMPLE PANEL	1				
MJ	SAMPLE CHILLER	1				
NA	FLY ASH SILO	1		1		Fly Ash from either Unit 2 or Unit 1 can be directed to either silo
NA	FLY ASH SILO FILTER/SEPARATOR	2		2	100% Capacity Each	Fly Ash from either Unit 2 or Unit 1 can be directed to either silo
NA	FLY ASH SILO VENT FILTER	1		1		
NA	AQCS RECYCLE BIN FILTER/SEPARATOR	1		1		
NA	FLY ASH HEAD CIRCULATION PUMP	1		1		
NA	DENSE ASH SLURRY MIXING TANK FEED PUMP	2		2	50% Capacity Each	
NA	STANDBY AIR COMPRESSOR		1			

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
NA	PRIMARY AIR COMPRESSOR		1			
NA	FLY ASH SLURRY MIXING TANK	1		1		
NA	FLY ASH VACUUM EXHAUSTER		4		100% Capacity Each	Crosstied to serve either Unit 2 or Unit 1
NA	BED ASH CROSS CONVEYOR		2			Between Unit 2 and Unit 1 Bed Ash Silo Outlets
NA	BED ASH CLINKER GRINDERS	1		1		Above Dense Ash Slurry Mixing Tank
NA	DENSE ASH SLURRY MIXING TANK	1		1		
NA	DENSE ASH HEAD CIRCULATION PUMP	1		1		
NA	DENSE ASH SLURRY BOOSTER PUMP	2		2	100% Capacity Each	
NA	DENSE ASH SLURRY PISTON DIAPHRAGM PUMP		2		100% Capacity Each	
NA	EMERGENCY FLUSH PUMP		1			
NB	BED ASH SILO	1		1		Bed Ash from either Unit 1 or Unit 2 can be directed to either silo
NB	BED ASH PRESSURE AIRLOCK VESSEL	4		4		
NB	BED ASH SURGE HOPPER	1		1		
NB	SIDE WALL STRIPPER/ COOLER	2		2		
NB	FRONT WALL STRIPPER COOLER	2		2		
NB	BED ASH SURGE HPR. VENT FILTER	1		1		
NB	BED ASH SILO VENT FILTER	1		1		

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
NB	ASH CLR. DISCHARGE CONVEYOR	4		4		One from each Stripper Cooler
NB	BED ASH GATHERING CONVEYOR	2		2		
NB	BED ASH CLINKER GRINDER	2		2		Above Bed Ash Surge Hopper
NB	BED ASH TRANSPORT BLOWER		3		100% Capacity Each	Crosstied to serve either Unit 2 or Unit 1
NB	BED ASH SURGE HOPPER VENT FILTER EXHAUST FAN	1		1		
NL	REUSE WATER ACID FEED PUMP SKID		1			
NL	REUSE WATER INHIBITOR FEED PUMP SKID		1			
NL	REUSE WATER CHEMICAL FEED STATIC MIXER		1			
NL	REUSE WATER SUPPLY PUMP		2		100% Capacity Each	
NL	CSU REUSE WATER BOOSTER PUMP		1			
NL	REUSE WATER STORAGE TANK		1			
NN	BSA SUMP		4			
NN	BSA SUMP PUMPS		8			Two Pumps per Sump
NN	BSA LEACHATE DETECTION SUMP		4			
NN	BSA LEACHATE DETECTION SUMP PUMP		8			Two Pumps per Sump
NN	BSA POND EFFLUENT SUMP		1			
NN	BSA POND EFFLUENT SUMP PUMP		2			

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
NN	WASTEWATER COLLECTION SUMP 12		1			
NN	WASTEWATER COLLECTION SUMP 12 SUMP PUMP		2			
NN	FUEL STORAGE DOME SUMP 13		1			
NN	FUEL STORAGE DOME SUMP 13 SUMP PUMP		2			
NN	SUBSURFACE DRAIN SUMP		3			
NN	SUBSURFACE DRAIN SUMP PUMP		6			Two Pumps per Sump
NN	BOILER SUMP	1		1		
NN	BOILER SUMP PUMP	2		2		
NN	AQCS SUMP	1		1		
NN	AQCS SUMP PUMP	2		2		
NN	ELEVATOR SHAFT SUMP PUMP	1		1		
QB	BOILER FEED PUMP	2		2	50% Capacity Each	One motor driven, one turbine shaft driven. With variable speed fluid drives.
QB	BOILER FEED PUMP SEAL WATER LEAK OFF RECOVERY TANK	1		1		
QF	FEED WATER HEATER NO. 2	1		1		
QF	FEED WATER HEATER NO. 1	1		1		
RA	AQCS GLYCOL CIRCULATING PUMP		2		100% Capacity Each	Serve Unit 2 and Unit 1

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
RA	AQCS ATOMIZING AIR COMPRESSOR	1	1	1	100% Capacity Each	
RA	AQCS ATOMIZING AIR RECEIVER		1			Serves Unit 2 and Unit 1
RA	AQCS GLYCOL/WATER SURGE TANK		1			Serves Unit 2 and Unit 1
RA	ATOMIZING AIR COMPRESSOR INLET AIR FILTER/SILER.	1	1	1		One per Compressor
RA	ATOMIZING AIR COMPRESSOR UNLOADING SILER.	1	1	1		One per Compressor
RA	LIME SLURRY FEED PUMP	2		2	100% Capacity Each	
RA	RECYCLE SLURRY TRANS. PUMP	2		2	100% Capacity Each	
RA	FEED SLURRY TRANS. PUMP	2		2	100% Capacity Each	
RA	FEED SLURRY PUMP	2		2	100% Capacity Each	
RA	AQCS FLUIDIZING AIR BLOWER	3		3	50% Capacity Each	
RA	AQCS FLUIDIZING AIR HEATER	3		3	50% Capacity Each	
RA	LIME SLURRY STORAGE TANK AGITATOR	1		1		
RA	RECY SLURRY STORAGE TANK AGITATOR	1		1		
RA	RECY SLURRY MIX TANK AGITATOR	1		1		
RA	LIME SLURRY STORAGE TANK	1		1		
RA	RECYCLE SLURRY MIX TANK	1		1		
RA	RECYCLE SLURRY STORAGE TANK	1		1		

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
RA	FLY ASH RECYCLE STORAGE BIN	1		1		
RA	FEED SLURRY HEAD TANK	1		1		
RA	SDA BIN ACTIVATOR	1		1		
RA	FLY ASH RECYCLE FEEDER	2		2	100% Capacity Each	
RA	SDA ASH CONVEYOR	1		1		
RA	SDA EMERGENCY DISCHARGE CONVEYOR	1		1		
RA	SDA ASH DELUMPER	1		1		
RA	SDA IMPACTOR	3		3		
RB	FABRIC FILTER COMPARTMENT	8		8		
RB	AQCS INSTRUMENT AIR DRYER		2		100% Capacity Each	Serve Unit 2 and Unit 1
RH	LIMESTONE STACK-OUT CONVEYOR		1			
RH	LIMESTONE FEED CONVEYORS TO LS PREP		3			One per Dryer/Mill Train
RH	LS PLANT AIR COMPRESSOR		2			Serve Unit 2 and Unit 1
RH	LS AIR HEATER COMBUSTION AIR FAN		3			One per Dryer/Mill Train
RH	LS DRYER/MILL DUST COLL EXHAUST FAN		3			One per Dryer/Mill Train
RH	LS PREP. DUST COLLECTOR EXHAUST FAN		3			One per Dryer/Mill Train
RH	LS PRODUCT PNEUMATIC BLOWER		3			One per Dryer/Mill Train

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
RH	LS PLANT AIR RECEIVER		2			Serve Unit 2 and Unit 1
RH	LIMESTONE PRODUCT SURGE BIN		3			One per Dryer/Mill Train
RH	LS AIR HEATER		3			One per Dryer/Mill Train
RH	LIMESTONE PREP. DUST COLLECTOR		3			One per Dryer/Mill Train
RH	LIMESTONE DRYER/MILL DUST COLL		3			One per Dryer/Mill Train
RH	LIMESTONE PRODUCT SCREEN		6			Two per Dryer/Mill Train
RH	LS PLANT AIR DRYER		2			Serve Unit 2 and Unit 1
RH	LIMESTONE PROD. ELEV CONVEYOR		3			One per Dryer/Mill Train
RH	LIMESTONE SCREEN FEEDER		3			One per Dryer/Mill Train
RH	LS SCREEN PRODUCT SCREW CONV.		3			One per Dryer/Mill Train
RH	LIMESTONE DRYER/MILL		3		100% Capacity Each for 1 Unit	Each Dryer/Mill Train can supply either Unit 2 or Unit 1
RH	RAW LIMESTONE IMPACTOR		3			One per Dryer/Mill Train
RL	AQCS MILL RECYCLE FEED PUMP		2		100% Capacity Each	Serve Unit 2 and Unit 1
RL	AQCS LIME SLURRY TRANSFER PUMP		4		100% Capacity Each	Serve Unit 2 and Unit 1
RL	AQCS LIME SLURRY TRANS. TANK AGITATOR		2			Serve Unit 2 and Unit 1
RL	AQCS LIME STORAGE SILO		1			Serves Unit 2 and Unit 1
RL	AQCS LIME SLURRY TRANSFER TANK		2			Serves Unit 2 and Unit 1

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
RL	AQCS MILL SEPARATING CHAMBER		2			Serves Unit 2 and Unit 1
RL	AQCS LIME STORAGE SILO BIN ACTIVATOR		1			Serves Unit 2 and Unit 1
RL	AQCS LIME STORAGE SILO DUST COLLECTOR		1			Serves Unit 2 and Unit 1
RL	AQCS MILL VENT SCRUBBER		2			Serves Unit 2 and Unit 1
RL	AQCS VERTICAL BALL MILL SLAKER		2			Serves Unit 2 and Unit 1
RN	LIMESTONE BLOWER	3		3	33-1/3% Capacity Each	
RN	STANDBY LIMESTONE BLOWER	1		1		
RN	LIMESTONE SILO	1		1		
RN	LIMESTONE FILTER/RECEIVER	3		3		
RN	LIMESTONE SILO VENT FILTER	1		1		
RN	LIMESTONE FILTER/REC. EXHAUSTER	3		3		
RN	LIMESTONE ROTARY FEEDER	3		3		
RN	LIMESTONE ROTARY AIRLOCK FEEDER	6		6		
RN	LIMESTONE ROTARY VALVE	3		3		
SI	INTREX™	3		3		
SI	INTREX™ BLOWER	3		3	50% Capacity Each	
SI	SEAL POT BLOWER	3		3	50% Capacity Each	

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
SJ	ERV SILENCER	1		1		
SK	CYCLONE	3		3		
SL	ECONOMIZER	1		1		
TG	STEAM TURBINE - LP	1		1		
TH	STEAM TURBINE - HP/IP	1		1		
TI	STEAM PACKING EXHAUSTER	1		1		
TJ	TURB LUBE OIL HEAT EXCHANGERS	2		2	100% Capacity Each	
TJ	TURBINE LUBE OIL CONDITIONER	2		2		One Bowser, One Turbo-Toc
TJ	TURBINE LUBE OIL TANK	2		2		One Operating Tank, One Storage Tank
TJ	TURBINE LUBE OIL PUMP	3		3		Two AC, One DC
TN	TURBINE ELECTRO-HYDRAULIC CONTROL UNIT	1		1		
UE	HYDRAZINE FEED PUMP	1		1		
UE	AMMONIA FEED PUMP	1		1		
UE	PHOSPHATE FEED PUMP	2		2	100% Capacity Each	
UE	PHOSPHATE STORAGE TANK	1		1		
UE	PHOSPHATE STG. TANK AGITATOR	1		1		
UR	AMMONIA PUMP	1	1	1	100% Capacity Each	Common Shared Spare

GEMS SYSTEM	DESCRIPTION	QUANTITY			CAPACITY	REMARKS
		UNIT 2	COMMON	UNIT 1		
UR	AMMONIA STORAGE TANK		1			Serves Units 2 and 1
WF	DEMINERALIZED WATER TRANSFER PUMPS		2			Added Demin Water from SJRPP for Units 1, 2, and 3
XE	CONDENSATE PUMP	2		2	100% Capacity Each	
XE	CONDENSER	1		1		
XE	DEBRIS FILTERS	2		2	50% Capacity Each	
XJ	RIVER WATER BOOSTER PUMP	2		2	100% Capacity Each	
XK	CLOSED COOLING WATER PUMP	2		2	100% Capacity Each	
XK	CLOSED COOLING WATER BOOSTER PUMP	2		2	100% Capacity Each	
XK	CLOSED COOLING WATER SURGE TANK	1		1		
XK	CLOSED COOLING WATER PLATE HEAT EXCHANGER	2		2	100% Capacity Each	
XL	CIRCULATING WATER PUMP	2		2	50% Capacity Each	

JEA
GROUP/SYSTEM DESCRIPTIONS

Group	**A**	Air	.
	System	B	Instrument
		C	Service
Group	**B**	Boiler	.
	System	A	Acid Cleaning
		B	Steam Generating Section
		C	Air Preheater
		D	Aspirating Air
		E	Combustion Control
		F	Burner Front
		H	Electronic Control
		I	Sootblowers
		J	Casing and Structure
		K	Vents and Drains
		N	Combustion Air Flow
		O	Combustion Gas Flow
		P	Convection Pass
		S	Service Steam
		T	Seal Air
		W	Wash Drains
Group	**D**	Diesel	.
	System	A	Engine/Generator
		B	Starting
Group	**E**	Electrical	.
	System	A	Control Room Instrumentation
		B	Plant Lighting and Dist.
		C	Communication
		D	120-250V DC
		E	Miscellaneous
		F	MCC/Load Center/Switchgear
		G	Switchyard
Group	**F**	Fuel	.
	System	A	Diesel Storage/Transfer
		B	Natural Gas
		C	Fuel Oil Service Pump
		D	Fuel Oil Burner Supply/Return
		E	Fuel Oil Heaters

F	Fuel Oil Storage/Transfer
G	Unloading Dock
H	Handling Solid Fuel
I	Ignitor Fuel Supply
M	Propane Gas
N	Day Silos
P	Pneumatic Transport
R	Rail Unloading Solid Fuel
S	Ship Unloader
W	Waste Derived
V	Vehicle Fuel Storage

Group G Generator .

System	A	Stator
	B	Rotating Field
	C	Seal Oil
	D	Hydrogen
	E	Exciter
	F	Voltage Regulator
	G	Protection Circuit
	H	Isolated Phase
	I	Stator Oil/Cooling Water

Group H Condensate .

System	B	Vacuum Supply
	D	Supply
	E	Recovery
	F	Flow
	K	Feedwater Heater Drains
	P	Polishers

Group I Intake .

System	A	Crane
	B	Traveling Screens
	D	Canal
	E	Sodium Hypochlorite

Group J Combustion Turbine .

System	A	Turning Gear
	B	Accessory Station
	C	Bearing/Coupling
	D	Compressor Section
	E	Lubricating Oil
	F	Protection/Control
	G	Combustor Section
	H	Drains, Vents, and Inlet Bleed Heating
	I	Housing

J	Closed Cycle Cooling Water
K	Compressor Water Wash
L	DEH Control
N	Exhaust
O	Supports
Q	Seal Oil
R	Starting
S	Turbine Section
T	Atomizing Air
U	Generator
V	CT CO_2 and H_2 Supply
W	Inlet Air Fogging
X	Water Injection

Group K Fire Protection .

System	D	Dry Chemical
	E	Control Room
	F	Foam
	J	Gas Turbine
	P	Portable
	W	Water

Group L Environmental .

System	A	Meteorological
	B	Air Quality Monitoring
	P	Permitting
	W	Groundwater Monitoring

Group M Miscellaneous .

System	A	Buildings and Grounds
	B	Turbine Deck Bridge Crane
	C	Bulk Instruments and Controls
	D	Hydraulic Tools and Equip.
	E	Pneumatic Tools and Equipment
	F	Other Tools and Equipment
	G	Electric Tools and Equipment
	H	Machine Shop Equipment
	I	Security
	J	Laboratory
	K	Plant Vehicles
	M	Bulk Motors or Electrical
	O	General Outage
	P	Bulk Piping
	Q	Overhead Costs
	R	Freeze Protection
	S	Startup
	U	Bulk Insulation

V	Bulk Valves
X	Bulk Painting

Group N Waste .

System	A	Fly Ash
	B	Bed Ash
	D	Liquid Waste
	F	Solid Waste Disposal
	L	Sewage Treatment
	M	Water Instrumentation
	N	Water & Boiler Wash Collection
	P	Pyrites
	U	Waste Fuel Collection

Group O General Group Equipment .

Group P Ventilation .

System	D	Steam Heating
	G	Air Conditioning
	J	Equipment Dry Layup
	K	Misc. Vents and Exhausts

Group Q Feedwater .

System	B	Boiler Feedwater Pump
	C	BFP Steam Turbine
	D	BFP Fluid Drive
	E	Auxiliary Feedwater
	F	Flow
	G	BFP Steam Turbine Lube Oil

Group R Air Quality Control System (AQCS) .

System	A	Absorber Scrubber
	B	Baghouse
	E	Controls
	G	Absorber (reserved for future)
	H	Handling Limestone
	L	Lime Preparation
	N	Day Silos
	P	Precipitator
	R	Rail Unloading Limestone
	S	Ship Unloading Limestone

Group S Steam

System	A	Auxiliary Piping
	C	Auxiliary Boiler
	D	Extraction Piping
	E	Reheat Piping
	F	Primary Superheating Section
	H	Reheat Superheating Section
	I	Secondary Superheating Section
	J	Main Steam Piping
	K	Cyclone Superheating Section
	L	Heat Recovery Area Superheating Section

Group T Steam Turbine

System	A	Front Standard
	B	HP Section
	C	Pedestal
	G	LP Section
	H	HP/IP Section
	I	Steam Seals
	J	Lubricating Oil
	K	Vents and Drains
	L	HP/IP Turbine Control
	M	Supervisory Instrumentation
	N	Turbine Controls
	S	Structure
	X	Crossover Pipe

Group U Chemical

System	A	Nitrogen Supply
	C	CO_2 and H_2 Supply
	D	Condenser Discharge Chemical Injection
	E	Condensate Chemical Injection
	L	Boiler Wash
	M	Miscellaneous
	R	AQCS
	S	Solid Fuel Treatment
	Y	Fuel Oil Treatment

Group W Water

System	A	Treatment Plant Filtering
	B	Treatment Plant Brine
	D	Treatment Plant Acid
	E	Treatment Plant Caustic
	F	Demineralizer

		H	Water Supply
		K	Potable Water Supply

Group **X** Cooling Water .

System	E	Condenser
	G	Condenser Cleaning
	J	River Water
	K	Closed Cooling
	L	Circulating Water

APPENDIX 5

PROJECT MILESTONE SCHEDULE

The Project Milestone Schedule on the following pages lists the significant milestone dates associated with the Repowering Project. Milestone dates are indicated for Unit 2 and Common Facilities, and also for Unit 1, since the Unit 1 project activities were implemented with only a planned three month lag behind Unit 2 and Common Facilities.

PROJECT MILESTONE SCHEDULE

	MILESTONE	Aug-99 Original Baseline	Feb-00 Updated Baseline	Sep-01 Updated Baseline	Jul-02 Approved DOE Schedule	Actual Completion
	JEA Large-Scale CFB Combustion Demonstration Project Cooperative Agreement Signed	27-Sep-97	27-Sep-97	27-Sep-97	27-Sep-97	27-Sep-97
DOE PHASE 1						
1.1	***PROJECT MANAGEMENT***					
	Project Management Plan	30-Sep-99	7-May-99	7-May-99	7-May-99	7-May-99
	Public Design Report	Not Sched	Not Sched	Not Sched	6-Nov-02	
	Environmental Monitoring Plan	2-Dec-99	2-Dec-99	2-Dec-99	2-Dec-99	2-Dec-99
1.2	***PERMITTING***					
	NEPA Completion	21-Oct-99	7-Dec-00	7-Dec-00	7-Dec-00	7-Dec-00
	FACE Water Permit	30-Jul-99	30-Jul-99	30-Jul-99	30-Jul-99	30-Jul-99
	ERP Permit	27-Jul-99	27-Jul-99	27-Jul-99	27-Jul-99	27-Jul-99
	NPDES Water Permit	13-Dec-99	15-Feb-00	15-Feb-00	15-Feb-00	15-Feb-00
1.3	***PRELIMINARY DESIGN***	3-Aug-98	3-Aug-98	3-Aug-98	3-Aug-98	3-Aug-98
1.4	***DESIGN / ENGINEERING***					
	Notice To Proceed					
	Boiler / AQCS	3-Aug-98	3-Aug-98	3-Aug-98	3-Aug-98	3-Aug-98
	Balance of Plant	1-Feb-99	1-Feb-99	1-Feb-99	1-Feb-99	1-Feb-99
	Material Handling	1-Feb-99	1-Feb-99	1-Feb-99	1-Feb-99	1-Feb-99
	40% Design Review	14-Jun-99	14-Jun-99	14-Jun-99	14-Jun-99	14-Jun-99
	90% Design Review	8-Sep-00	8-Sep-00	18-May-00	18-May-00	18-May-00
1.5	***FUELS SELECTION STUDY***	17-Oct-00	17-Oct-00	Not Presented	9-Sep-02	

	MILESTONE	Aug-99 Original Baseline	Feb-00 Updated Baseline	Sep-01 Updated Baseline	Jul-02 Approved DOE Schedule	Actual Completion
DOE PHASE 2						
2.1	***PROJECT MANAGEMENT***					
	Project Management Plan Update	Not Sched	Not Sched	Not Sched	9-Sep-02	
	Environmental Monitoring	Not Sched	Not Sched	Not Sched	Not Sched	Not Sched
	Startup Modification & Performance Report	Not Sched	Not Sched	Not Sched	6-Jan-03	
	50% Construction Review	10-Nov-00	10-Nov-00	25-Jan-01	25-Jan-01	25-Jan-01
	100% Construction Review	14-Dec-01	14-Dec-01	14-Aug-01	14-Aug-01	14-Aug-01
2.3	***BOILER EQUIPMENT & AQCS***					
	Notice to Proceed	16-Aug-99	16-Aug-99	16-Aug-99	16-Aug-99	16-Aug-99
	Unit 2 - Boiler Island Foundations	17-Dec-99	20-Jan-00	20-Jan-00	20-Jan-00	20-Jan-00
	Unit 2 - Boiler Steel Erection	29-May-01	31-May-01	23-May-01	23-May-01	23-May-01
	Unit 2 - Raise Steam Drum	1-Jun-00	1-Jun-00	3-Jun-00	3-Jun-00	3-Jun-00
	Unit 2 - Hydrotest	29-May-01	14-Jun-01	23-May-01	23-May-01	23-May-01
	Unit 2 - Chemical Cleaning	1-Oct-01	1-Oct-01	10-Sep-01	10-Sep-01	10-Sep-01
	Unit 2 - First Fire (Gas)	2-Jul-01	5-Oct-01	30-Oct-01	30-Nov-01	30-Nov-01
	Unit 2 - Steam Blows	1-Feb-02	8-Oct-01	15-Nov-01	3-Jan-02	3-Jan-02
	Unit 2 - First Fire (Solid Fuel)	1-Oct-01	13-Oct-01	2-Dec-01	14-Feb-02	14-Feb-02
	Unit 2 - Intial Sync	1-May-02	9-Oct-01	1-Dec-01	19-Feb-02	19-Feb-02
	Unit 2 - Preliminary Substantial Completion	8-Aug-02	2-Jan-02	14-Feb-02	18-Jul-02	
	Unit 2 Reliability Test	1-Feb-02	1-Feb-02	1-Apr-02	13-Sep-02	
	Unit 2 - Substantial Completion	8-Nov-02	4-Apr-03	15-May-02	19-Sep-02	
	Unit 1 - Boiler Island Foundations	26-Apr-00	9-Feb-00	9-Feb-00	9-Feb-00	9-Feb-00
	Unit 1 - Boiler Steel Erection	28-Aug-01	18-Sep-01	17-Aug-01	17-Aug-01	17-Aug-01
	Unit 1 - Raise Steam Drum	27-Sep-00	6-Sep-00	11-Sep-00	11-Sep-00	11-Sep-00
	Unit 1 - Hydrotest	28-Aug-01	18-Sep-01	27-Sep-01	4-Oct-01	4-Oct-01
	Unit 1 - Chemical Cleaning	8-Jan-02	23-Jan-02	18-Dec-01	18-Feb-02	18-Feb-02
	Unit 1 - First Fire (Gas)	8-Aug-02	20-Sep-02	3-Feb-02	13-Mar-02	13-Mar-02

	MILESTONE	Aug-99 Original Baseline	Feb-00 Updated Baseline	Sep-01 Updated Baseline	Jul-02 Approved DOE Schedule	Actual Completion
	Unit 1 - Steam Blows	1-Feb-02	30-Oct-02	17-Feb-02	7-Apr-02	7-Apr-02
	Unit 1 - First Fire (Solid Fuel)	6-Sep-02	18-Oct-02	12-Mar-02	31-May-02	31-May-02
	Unit 1 - Intial Sync	6-Sep-02	17-Oct-02	11-Mar-02	29-May-02	29-May-02
	Unit 1 - Preliminary Substantial Completion	8-Aug-02	27-Dec-02	2-Jun-02	22-Sep-02	
	Unit 1 - Reliability Test	10-Sep-02	29-Jan-03	24-Jun-02	21-Nov-02	
	Unit 1 - Substantial Completion	8-Nov-02	1-Apr-03	31-Aug-02	21-Nov-02	
2.4	***BALANCE OF PLANT***					
	Notice to Proceed	27-Jul-99	27-Jul-99	27-Jul-99	27-Jul-99	27-Jul-99
	Unit 2 - BOP Completion	4-Sep-01	9-Nov-01	17-Jan-02	8-Mar-02	8-Mar-02
	Unit 1 - Cutover Outage	Not Sched	Not Sched	15-Sep-01	15-Sep-01	15-Sep-01
	Unit 1 - BOP Completion	1-May-02	31-May-02	14-Jan-02	12-Apr-02	12-Apr-02
2.5	***MATERIAL HANDLING EQUIPMENT***					
	Conveyor Mechanically Complete	10-Aug-01	10-Jul-01	23-Oct-01	7-Nov-01	7-Nov-01
	Continuous ShipUnloader	17-Jul-01	4-Jun-01	3-Oct-01	3-Oct-01	3-Oct-01
	Fuel Storage Dome"A" - Stacker Reclaimer	20-Feb-01	12-Jun-01	28-Sep-01	28-Sep-01	28-Sep-01
	Fuel Storage Dome"B" - Stacker/Reclaimer	29-Aug-01	29-Aug-01	13-Nov-01	30-Nov-01	30-Nov-01
2.6	***TURBINE / GENERATOR REFURBISHMENT***					
	Unit 2 - Turbine Refurbishment	5-Oct-01	11-Jul-01	23-Nov-01	15-Feb-02	15-Feb-02
	Unit 1 - Turbine Refurbishment	1-May-02	1-May-02	3-Feb-02	12-Apr-02	12-Apr-02
DOE PHASE 3						
3.1	***PROJECT MANAGEMENT***					
	Project Management Plan Update	Not Sched	Not Sched	Not Sched	9-Sep-02	
	Environmental Monitoring / Test Plan	Not Sched	Not Sched	Not Sched	23-Sep-02	
	Public Design Report	Not Sched	Not Sched	Not Sched	6-Nov-02	

	MILESTONE	Aug-99 Original Baseline	Feb-00 Updated Baseline	Sep-01 Updated Baseline	Jul-02 Approved DOE Schedule	Actual Completion
3.4	***FUEL FLEXIBILITY***					
	Test 1 - 100% Pitt #8	Not Sched	Not Sched	1-Jul-02	14-Sep-02	
	Test 2 - 50% Pitt #8 / 50% Petcoke	Not Sched	Not Sched	6-Sep-02	1-May-03	
	Test 3 - 10% Pitt #8 / 90% Petcoke	Not Sched	Not Sched	7-Nov-02	1-Nov-03	
	Test 4 - 100% Illinois #6	Not Sched	Not Sched	7-Jan-03	1-Feb-04	
3.7	***FINAL REPORT***					
	Economic Evaluation Report	Not Sched	Not Sched	Not Sched	30-Jul-04	
	Final Technical Report	Not Sched	Not Sched	Not Sched	17-Sep-04	

APPENDIX 6

ABBREVIATION LIST

Following is a definition of abbreviations used in this report. Note that at their first use, these terms are fully defined in the text of the report, followed by the abbreviation in the parenthesis. Subsequent references use the abbreviation only.

Abbreviation	Definition
AQCS	Air Quality Control System
BC	Belt Conveyor
BF	Belt Feeder
BMS	Burner Management System
BOP	Balance of Plant
BSA	Byproducts Storage Area
btu	British Thermal Unit
CFB	Circulating Fluidized Bed
DCS	Distributed Control System
DOE	Department of Energy
FF	Fabric Filter
FSH	Final Steam Heating
FWEC	Foster Wheeler Energy Corp.
FWUSA	Foster Wheeler USA
gpm	gallons per minute
gr/acf	grains per actual cubic foot
gr/dscf	grains per dry standard cubic foot
HHV	Higher Heating Value
HP	High-Pressure
HRA	Heat Recovery Area
ID	Induced Draft
IP	Intermediate Pressure

ISH	Intermediate Superheater
kw-yr	kilowatt-year
lb/mmbtu	pounds per million Btu
LP	Low-Pressure
MBtu	Million Btu
MCC	Motor Control Center
MCR	Maximum Continuous Rating
mwh	megawatts per hour
NGS	Northside Generating Station
NS	Northside
P&ID	Piping and Instrumentation Diagram
PA	Primary Air
pcf	pounds per cubic foot
PLC	Programmable Logic Controller
ppm	parts per million
PSH	Primary Superheater
psig	pounds per square inch pressure gauge
RSH	Reheat Superheater
SA	Secondary Air
SDA	Spray Dryer Absorber
SNCR	Selective Non-Catalytic Reduction
SUS	Secondary Unit Substation
TB	Transfer Building
tph	tons per hour
TWIP	Turbine Water Induction Prevention
WAPC	Wheelabrator Air Pollution Control
wt %	weight percentage